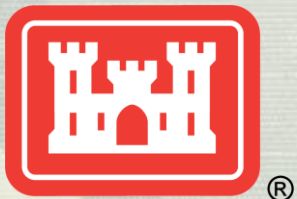


HHD & Water Management

Lt. Col. Thomas M. Greco

Deputy District Commander, South Florida
Jacksonville District
U.S. Army Corps of Engineers

WRAC
8 August 2013



BUILDING STRONG®

US ARMY CORPS OF ENGINEERS | JACKSONVILLE DISTRICT

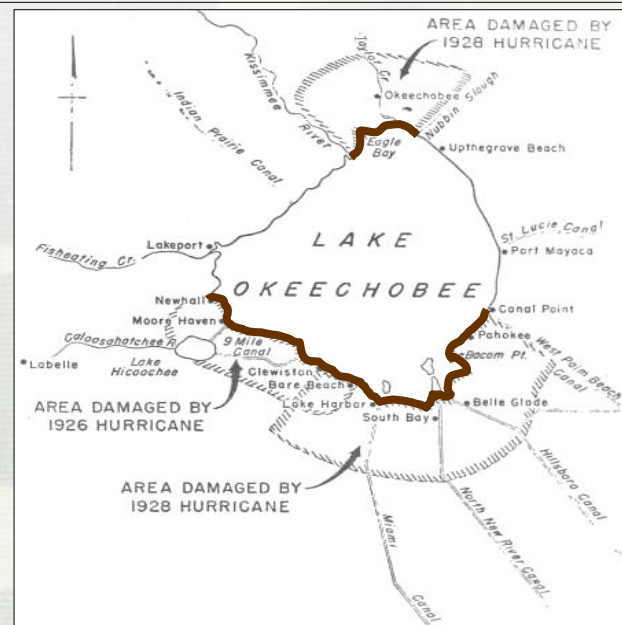


Original Levees Along Lake Okeechobee

- Authorized by Congress as part of the Rivers and Harbors Act of 1930
- Levee authorized as part of the navigation project

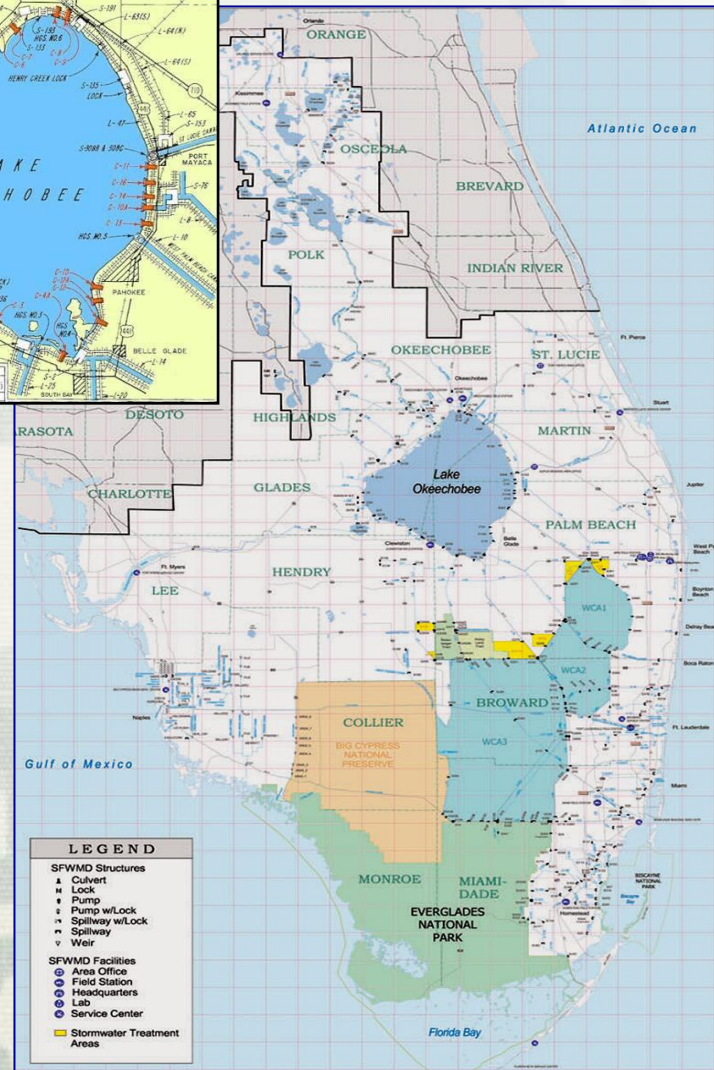
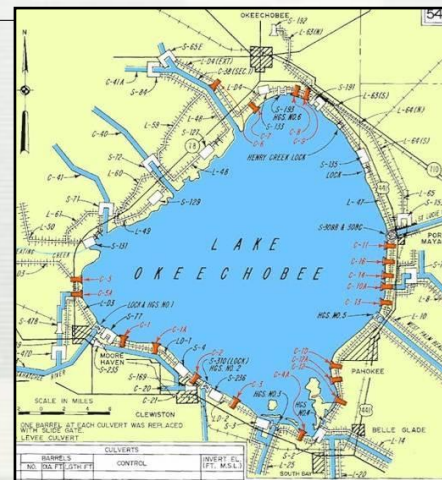


**Pahokee
Pre & Post
Construction**



Herbert Hoover Dike

- Constructed as part of the Central & Southern Florida Flood Control project (Flood Control Act of 1948)
- 143 miles of embankment around Lake Okeechobee
 - 32 federal culverts
 - 5 spillway inlets
 - 5 spillway outlets
 - 9 navigation locks
 - 9 Pump stations
 - Height: 32' – 45'
 - Avg width: 20' top / 250' bottom
- Inflow capacity exceeds outflow capacity
- Drainage basin ~ 4,600 sq. miles



HHD Problems

■ Embankment

- Internal erosion (seepage, piping)
- Through embankment
- Through foundation

■ Culvert Structures

- Erosion into the structure
- Erosion around the structure (piping)

- One of highest priorities in the U.S.: *Urgent & Compelling* situation requiring significant & immediate action

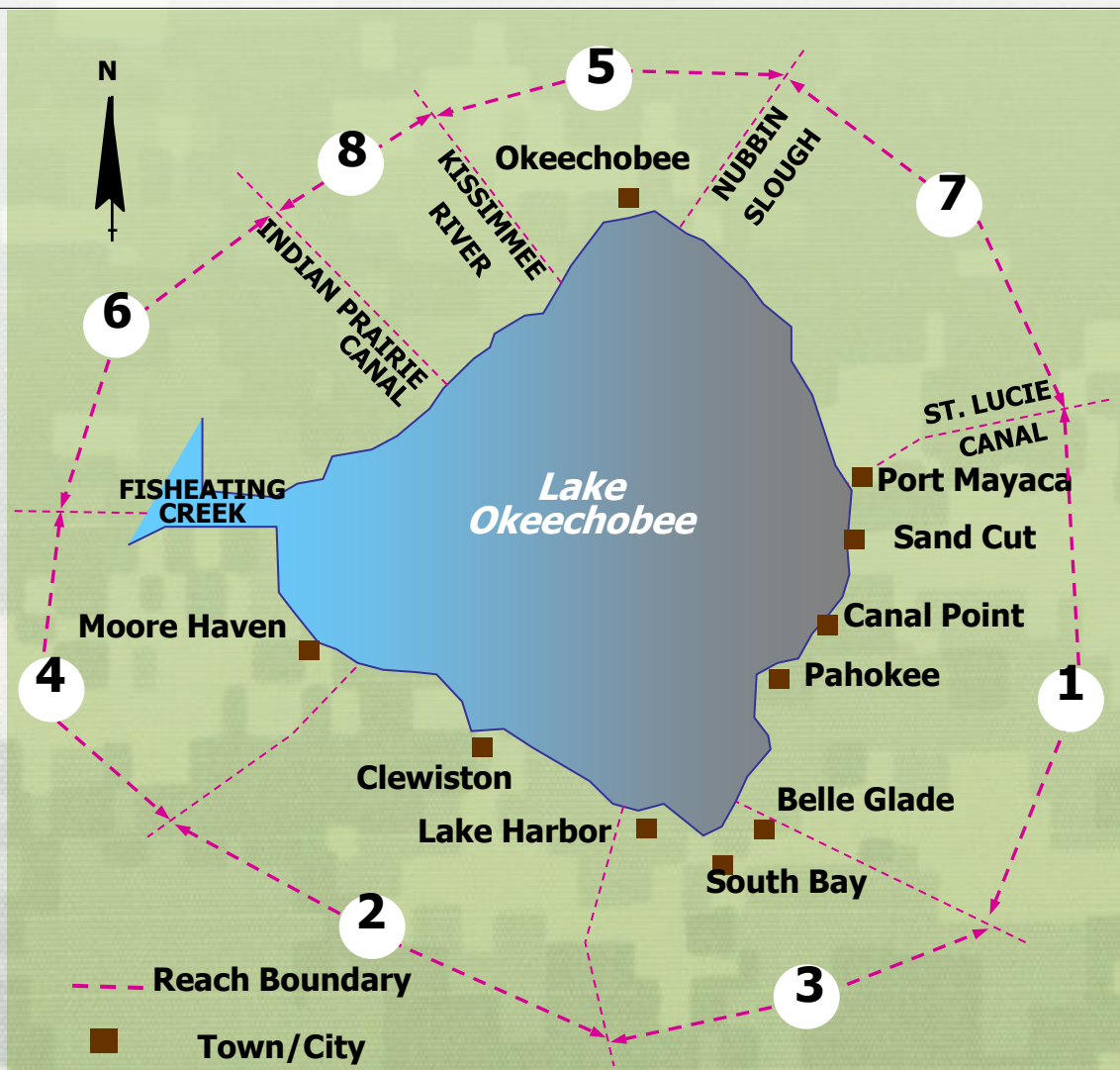
Probability of
breach
without
intervention

Lake Elevation (ft., NGVD)	Combined Probability of HHD Breach (%)
15	1
17	11
18	45
21	100

(Table H-10.2, 1998 HHD MRR & LORS FEIS, A-3)



HHD Solutions



Major Rehabilitation Report (MRR) 2000

- 143 miles of embankment
- Divided into 8 reaches

Reach 1 Rehab Plan

- Cut-off wall
- Seepage berm
- Culvert replacements

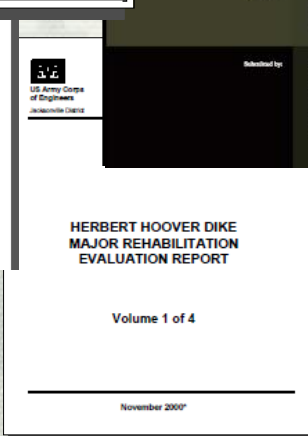
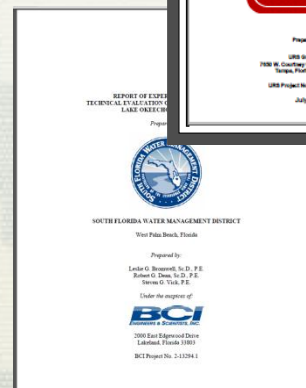
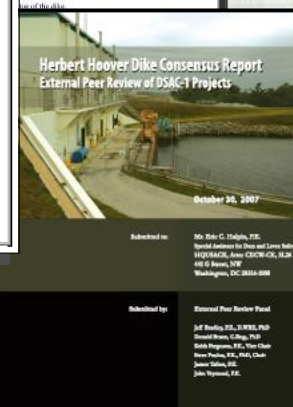
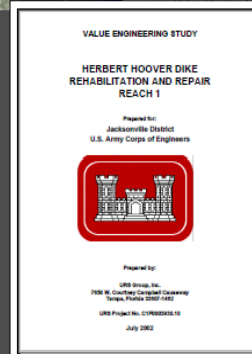
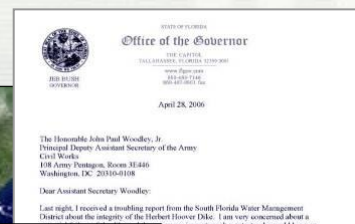
Risk-Based Approach

- System-wide risk
- Prioritize implementation
 - Cut-off wall and culvert replacements
 - Planning for remaining features complete in 2015



Interim Risk Reduction Measures

- Lake Okeechobee Regulation Schedule (LORS 2008)
- Toe ditch filling
- Quarry backfill
- Culvert removal
 - IPPC-1 & IPPC-2
- Culvert rehabilitation
 - FC-1 & HP-7 replacement
 - HP-5 barrel lining
- Tree and unwanted vegetation removal
- HHD Emergency Action Plan (EAP)
- Emergency exercises and EAP updates
- Inspections
- Communication plan



Rehabilitation Progress

Reach 1 Cut-off Wall MATOC

- 21.4 miles of installation completed in Reach 1 for \$220M

Water Control Structures (Culverts)

- Culvert 14 removal - \$4.7M completed in May 2012
- S-269 (C-11) & S-270 (C-16) - \$44M, completion in Apr 2015
- S-279 (C-1A) & S-280 (C-1) - \$49M, completion in Nov 2015
- S-276 (C-4A) & S-277 (C-3) - \$25M, completion in Feb 2016
- Culverts 7, 9 and TCC Abandonments - \$4.7M completion in late 2014

FY 2013 Awards: 6 culvert replacements,
Seepage Management Test Facility



Culvert Replacements, Removals, and Abandonments



KEY

- 9 Ongoing
- 6 FY 2013
- 4 FY 2014
- 3 FY 2015
- 4 FY 2016
- 3 FY 2017

FY11

FY18



Water Control & Management

Lake Okeechobee

- Structural, meteorological, environmental, hydrologic constraints
- Area: ~730 square miles
- Max Release to Tide @18.5 ft= 17,800 cfs
- Max Release South – 5,300 cfs
- Contributing basin: ~4,600 square miles

Water Conservation Areas (WCA's)

- Area: ~ 1300 sq miles
- Managed to meet multiple authorized purposes
- System conditions limit delivery of water from Lake Okeechobee
- Compartmentalization

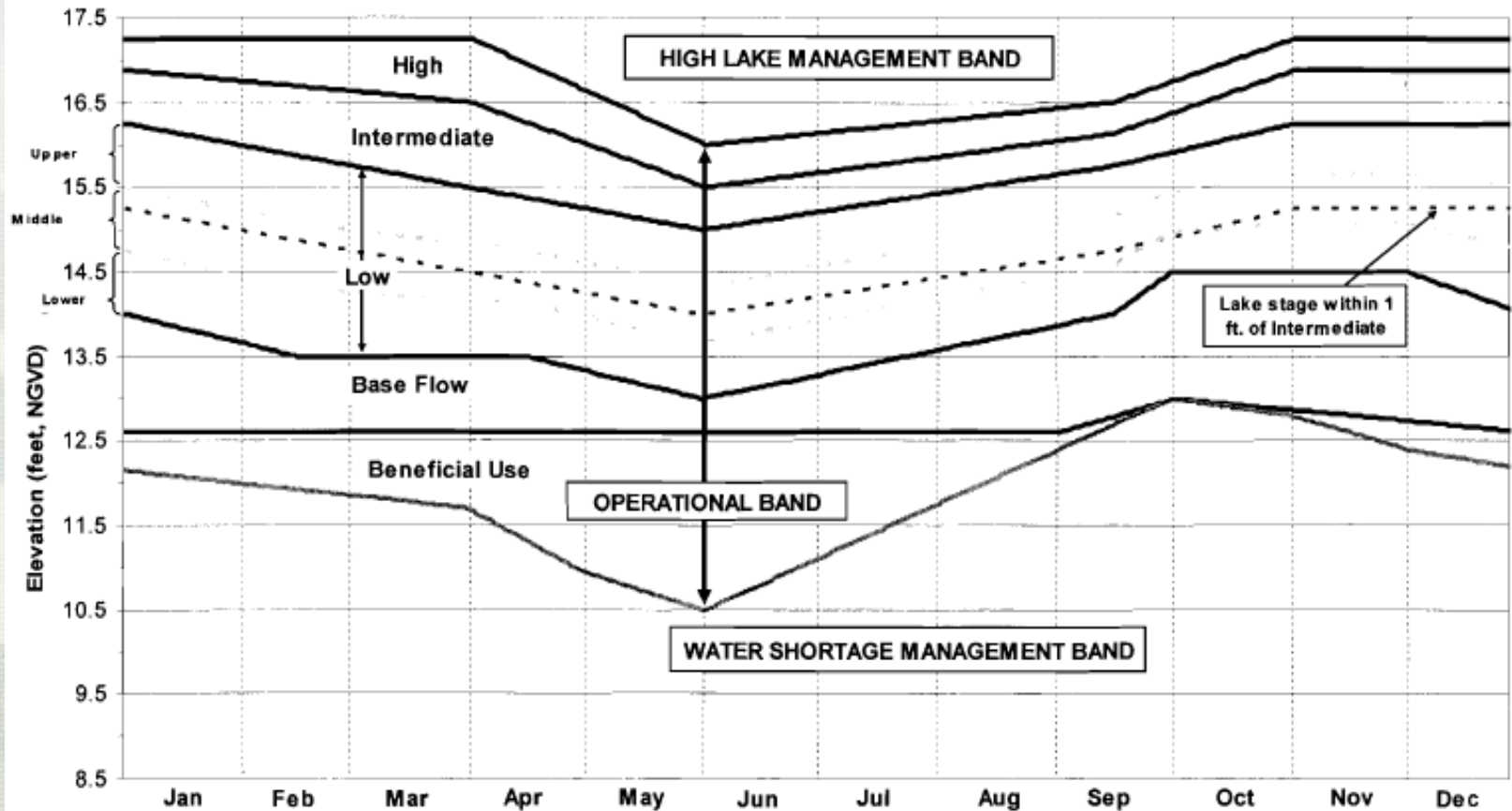
C&SF Project Purposes (1948)

- Flood control
- Drainage/Water control
- Groundwater recharge
- Water Supply
- Prevention of saltwater intrusion
- Navigation
- Fish/wildlife preservation
- Recreation

16 subsequent authorizations added or modified C&SF purposes



2008 LORS - Part B



CENTRAL AND SOUTHERN FLORIDA PROJECT

2008 LAKE OKEECHOBEE
INTERIM REGULATION SCHEDULE
PART B

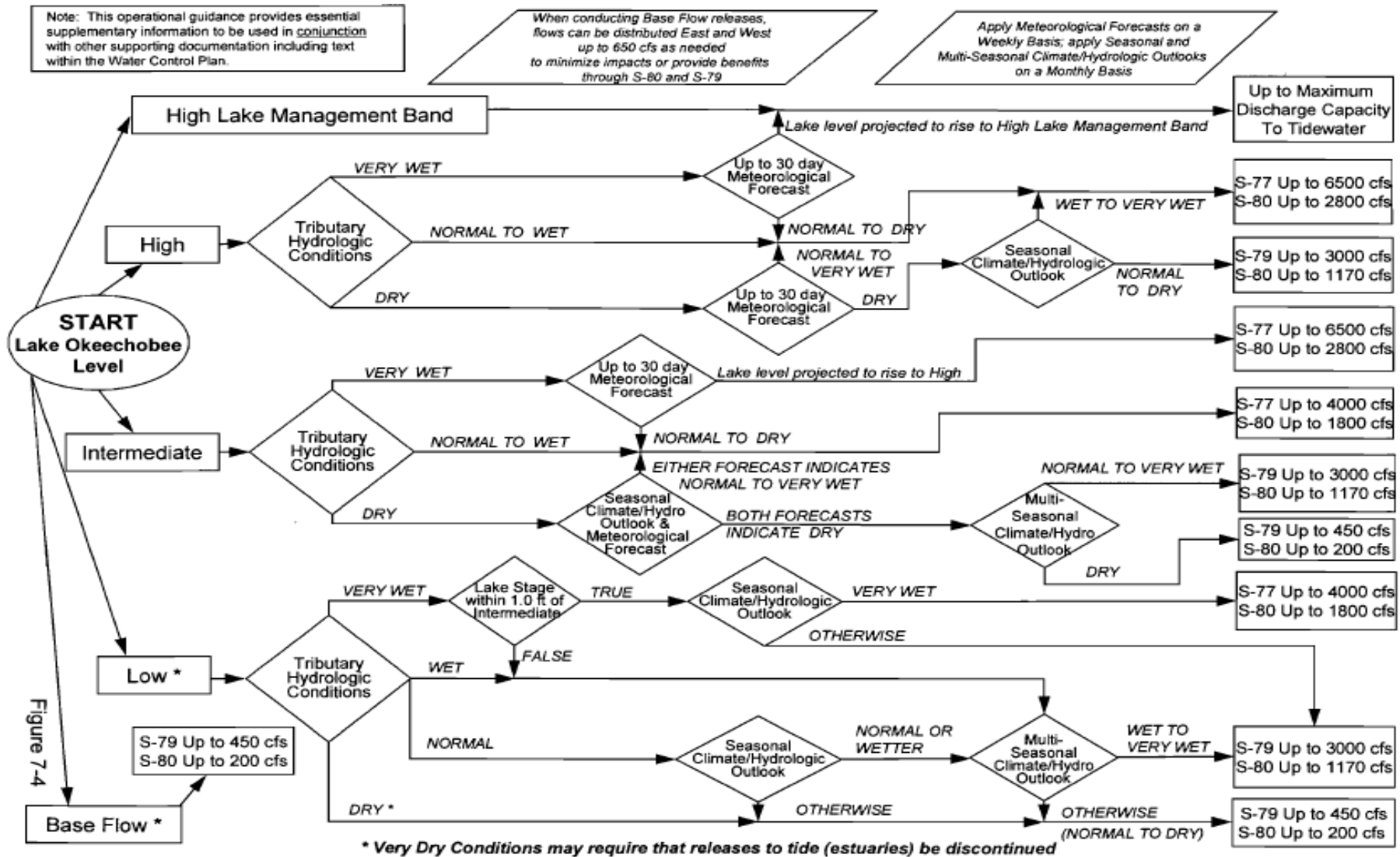
DATED: March 2008

DEPARTMENT OF THE ARMY, JACKSONVILLE DISTRICT
CORPS OF ENGINEERS, JACKSONVILLE, FLORIDA



2008 LORS - Part D

Allowable Releases to Tide (Estuaries)

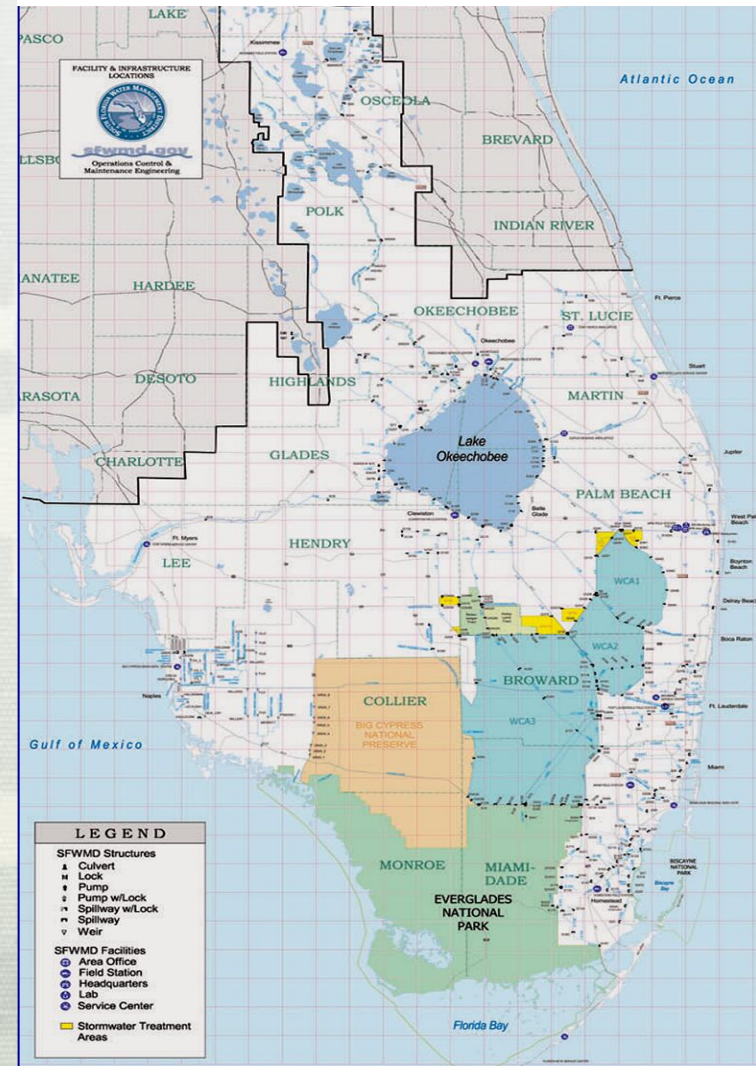


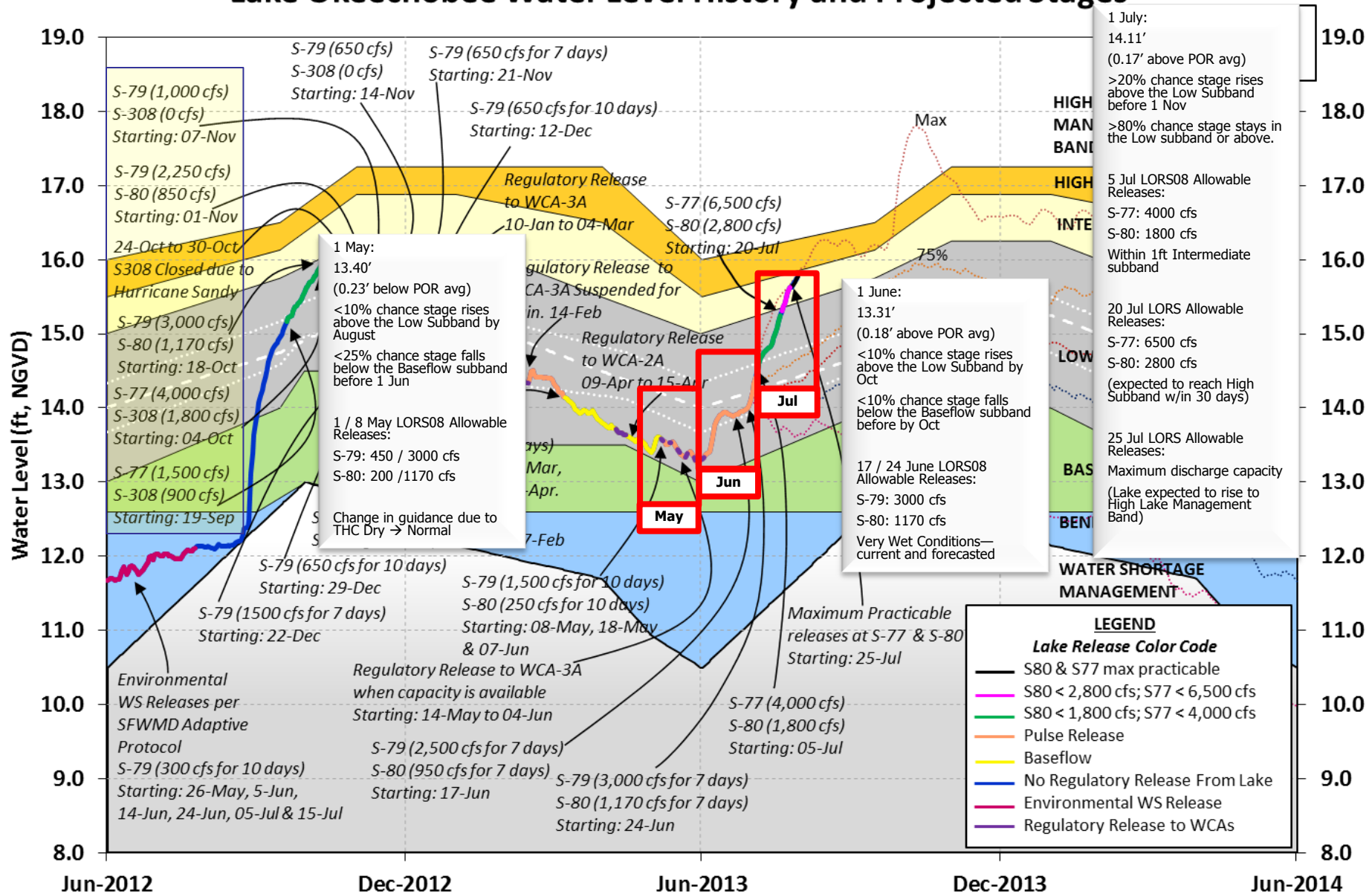
Lake O & WCAs

Decision: rate of release (dry and wet seasons)

- Central and Southern Florida Project conditions
- Current climate conditions
- Water levels
- Stormwater Treatment Area available capacity
- Historical levels
- Estuary conditions/needs
- Ecological conditions/needs
- Climatic forecasts
- Hydrologic outlooks
- Projected level rise/recession
- Water supply conditions/needs

C&SF system covers 15,000+ square miles





Projected Stage Percentiles From SFWMD-HESM Position Analysis